GUIDELINES FOR THE PREVENTION AND CONTROL OF VANCOMYCIN RESISTANT ENTEROCOCCI (VRE) IN LONG TERM CARE FACILITIES

INTRODUCTION

Vancomycin-resistant enterococci (VRE) have recently emerged as epidemiologically important pathogens in health care facilities throughout the United States and abroad. While the apparent incidence of VRE is lower in South Dakota than in other parts of the U.S., VRE has been identified with markedly increasing occurrence by several facilities in the state. This increase is of concern because of the lack of alternative antimicrobials for the treatment of infections due to VRE, as most VRE are also resistant to multiple other antibiotics. In addition, the potential exists for VRE to transfer genetic vancomycin resistance to other gram-positive organisms, especially *Staphylococcus aureus* and coagulase-negative staphylococci. Based upon experiences elsewhere, the prevalence of VRE in South Dakota communities is likely to increase. As local prevalence increases, incidence of infection related to this epidemiologically important pathogen will also rise.

In November of 1995, healthcare professionals in the Sioux Falls community established the Task Force on Antimicrobial Resistance (TFAR). The purpose of the TFAR was to develop an understanding of the potential effects of multiple-resistant bacteria and to develop strategies for mitigating these effects. The initial focus of the task force was on VRE. The TFAR was comprised of infectious disease specialists; physician chairs of infection control committees; pathologists; microbiologists; laboratorians; clinical pharmacists; infection control practitioners; and state public health officials.

The TFAR recognized that to be successful, VRE control efforts must include representative, timely, laboratory-based surveillance; prudent prescribing of vancomycin; effective infection control programs; well-informed discharge and transfer planning; targeted education of health care providers and the public; and ongoing evaluation of policies and interventions. However, it was also recognized that the development and application of specific prevention and control activities must be dependent upon the relative magnitude of the VRE problem within the state and respective communities, and the capacity to respond in each particular healthcare setting.

All health care institutions must become aware of the threat VRE poses, and involved in the control of preventing the spread of resistant pathogens. Long term care facilities may be especially challenged by VRE due to the at-risk resident population and frequent patient transfers to and from acute care institutions. ***However, the strategy developed for acute care facilities based upon national recommendations, may not be feasible or may unnecessarily restrict quality of life issues for long term or residential care settings. Guidelines developed must be revised to best meet the needs of individual healthcare facilities and their residents.***

EPIDEMIOLOGY

Enterococci are gram-positive bacteria that are part of the normal bowel flora of humans. The most important species, *Enterococcus faecalis* (85-90% of isolates) and *E. faecium* (5-10% of isolates), are a leading, and increasing, cause of nosocomial infections.

Urinary tract infections (UTI) are the most common enterococcal infections in humans, and are usually associated with instrumentation or structural abnormality of the urinary tract. Wounds, usually intra-abdominal and pelvic, are the second most common site of enterococcal infection. Bacteremia is the third most common infection caused by enterococci and is frequently secondary to enterococcal UTI, intra-abdominal infection, cholangitis, and infection of intravenous or intra-arterial catheters. Enterococci are estimated to cause 5-15% of all cases of bacterial endocarditis.

Although not particularly virulent compared to *Staphyloccus aureus* or *Streptococcus pyogenes*, enterococci are important pathogens because of their resistance to multiple antimicrobial agents. All enterococci have intrinsic low-level or relative-resistance to penicillin, cephalosporins, aminoglycosides, and lincosamides. In recent years, some strains have acquired high-level resistance to multiple antibiotics including aminoglycides, ampicillin and vancomycin. They readily acquire resistance to tetracyclines, macrolides and chloramphenicol. Rare strains may produce beta-lactamase. Vancomycin resistance is of particular concern because of treatment difficulties, and because of the potential for this plasmid-mediated vancomycin resistance trait to be transferred to other microorganisms. In the event methicillin-resistant *S. aureus* (MRSA) were to acquire vancomycin resistance, this pathogen would become virtually untreatable with current antibiotics.

A dramatic increase in incidence of VRE has been reported in the past few years. From 1989 through 1993, the percent of nosocomial enterococcal infections reported to the Centers for Disease Control and Prevention's (CDC) National Nosocomial Infections Surveillance System (NNIS) that were due to VRE increased from 0.3% to 7.9%. This increase was directly related to a 34-fold rise in prevalence of VRE infections in ICU patients, 0.4% to 13.4%. NNIS data from 1994 show a continuing increase in the incidence of VRE infection to 14.7% in ICU patients and 9.4% in non-ICU settings.

Populations at increased risk for VRE infection or colonization include critically ill patients, or those with severe underlying disease or immunosuppression such as ICU, transplant, and oncology patients, patients undergoing intra-abdominal or thoracic surgery, or with indwelling urinary or central venous catheters, and those having prolonged hospitalizations. Patients receiving vancomycin or multiple-antimicrobial agents, especially broad-spectrum cepahlosporins, are at increased risk for infection and colonization with VRE.

Enterococci can spread by direct patient-to-patient contact, or indirectly via transient carriage on the hands of personnel and patient-care equipment. However, most often, the organisms source is the patient's own gastrointestinal tract.

GOALS OF VRE CONTROL IN LONG TERM CARE FACILITIES

The primary goals of a VRE prevention and control program for long term care facilities include:

- -Preventing the transmission of VRE:
  to residents within the facility
  to staff and visitors of the facility, and
  to those outside the facility when residents are transferred.
- -Allowing for appropriate admission or readmission of patients with VRE.
- -Preventing the potential transfer of vancomycin resistance to other gram-positive microorgansims (including *S. aureus* and *S. epidermidis*) within the facility and the community.

PREVENTION AND CONTROL MEASURES

Education

All employees of a LTCF should receive education and training regarding the importance of VRE control. Education should be provided regularly, at least annually, and may be incorporated into a larger infection control training program. In addition, refresher training in infection control practices should be provided in response to any increase in VRE frequency within the facility.

More detailed information regarding VRE may be obtained by referring to any of the references listed in the bibliography, or by conducting a literature review for newly published material. In addition, the State Department of Health or TFAR members may be contacted for further information or assistance.

Prudent Antibiotic Use

Vancomycin use is a risk factor for colonization and infection with VRE. Education and awareness of antibiotic prescribers is important in VRE control. LTCF's should distribute information on appropriate vancomycin use to their prescribers, and monitor utilization within the facility. The CDC has provided recommendations for the prudent use of vancomycin which are included as Appendix A.

Of particular importance is to **discourage** the use of vancomycin in the following situations:

- -Treatment in response to a single blood culture positive for coagulase-negative staphylococcus, if other blood cultures drawn in the same time frame are negative.
- -Continued empiric use for presumed infections in patients whose cultures are negative for beta-lactam-resistant gram-positive organisms.
- -Primary treatment of antibiotic-associated colitis (Clostridium difficile and others).

In addition to vancomycin, use of broad spectrum antimicrobial agents, especially third generation cephalosporins, in situations of questionable benefit (such as the treatment of asymptomatic bacteriuria) should be discouraged.

Surveillance and Identification of Patients with VRE

Surveillance for vancomycin-resistant enterococci (VRE) is complicated by the fact that, in most instances, only a proportion of those individuals carrying the organism have clinically significant disease. Although such carriers may be asymptomatic, they can be a source for transmission of the organism to an individual who will later develop a clinically significant infection. Therefore, adequate measures to prevent transmission of organisms from one person to another must be the basis of infection control techniques used in the care of all residents, regardless of the known diagnosis or presence of colonization.

Routine surveillance cultures of residents, staff or the environment are **not** recommended. Culturing for VRE should be performed according to *clinical* criteria established by the LTCF. When culturing is performed, the LTCF should ensure that the laboratory:

- Routinely test all enterococci-positive cultures for vancomycin resistance.
- Is capable of detecting both high and moderate levels of vancomycin resistance.
- Immediately contacts the LTCF of any positive VRE findings.

VRE Colonization is defined as the presence of a positive culture for VRE in the absence of clinical signs or symptoms of infection. Sites of colonization frequently include urine or stool. VRE Infection is defined as the presence of a positive culture for VRE accompanied by signs or symptoms of infection related to the same body site.

Appropriate documentation of the presence of VRE colonization or infection should be made in the resident's record (e.g., problem list or care plan). All cases of VRE should be documented in a line-listing which trends common factors related to risk and transmission. This information should be reviewed by professionals responsible for infection control at the LTCF. Evaluation of the data for implications of cross-contamination or nosocomial acquisition is essential to monitor the effectiveness of prevention and control activities.

A resident's primary care provider(s) and the medical director of the facility should be notified when the resident is newly identified as a VRE case. In addition, health care providers should be made aware of the presence of VRE colonization or infection and precautions in addition to standard infection control measures should be considered, as outlined below.

Treatment Guidelines

It is not routinely recommended to treat VRE colonization. Treatment guidelines for VRE infection have not been established. Infectious Disease consultation should be considered.

INFECTION CONTROL PRACTICES

Consistent application of sound infection control practices will reduce the spread of many nosocomial pathogens, including VRE. Such practices do not depend on the identification of VRE colonization or infection, and should be applied in the care of all residents. Specific practices should be performed in addition when caring for patients colonized or infected with VRE.

Handwashing and barrier precautions

- An antiseptic soap such as chlorhexidine gluconate or povodone iodine is recommended for handwashing.

- Employees and visitors should wash hands after any contact with a resident colonized or infected with VRE or with contaminated equipment or supplies. Hands should be washed prior to leaving the resident's room without fail.

- Due to the importance of handwashing in the prevention of transmission of VRE and other resistant organisms and communicable illnesses, facilities should develop methods to monitor and ensure compliance with this vital infection prevention and control strategy.

- Residents colonized or infected with VRE should wash his/her hands after any personal hygiene activities and prior to leaving his/her room for group activities. Residents should be taught appropriate handwashing practices. Residents who cannot wash his/her own hands should be assisted with handwashing in these instances.

- Employees should wear gloves when providing care which involves any personal contact with the resident or contaminated equipment or supplies. During the course of providing care, if hands have become soiled with potentially infectious material or body excretions, gloves should be changed and hands washed before further contact with clean surfaces, the resident or other persons.

- Appropriate hand technique should be followed with care taken to avoid touching environmental surfaces, equipment or supplies, or other persons after caring for a resident colonized or infected with VRE and prior to washing hands.

- Cover gowns should be worn if the provider's clothing is likely to have substantial contact with the body fluids known to be colonized or infected with VRE. Gowns should be removed immediately following such care.

Environmental cleaning and disinfection

Rooms of VRE colonized or infected residents should be cleaned daily paying particular attention to frequently touched surfaces (e.g., bed rails, bedside tables, doorknobs) An EPA-approved hospital grade disinfectant-detergent, prepared and dispensed in accordance with the manufacturer's instructions should be used for cleaning and disinfection. **It should be noted that, although VRE is difficult to treat in the individual, it is not more difficult to eradicate from environmental surfaces than other enterococci or similar bacteria.**

Meticulous cleaning and disinfection of items shared among residents is basic to standard infection control. Patient-care equipment which has been in contact with a resident colonized or infected with VRE should always be cleaned and disinfected prior to use on another resident.

Upon discharge or transfer, the room of a colonized or infected VRE resident should undergo "terminal cleaning" with an EPA-approved hospital grade detergent-disinfectant.

Room Placement

Basic infection control principles of roommate selection should be followed regardless of known colonization or infection with VRE or other resistant organisms. For example, residents with uncontained drainage, incontinence of stool, or particularly poor personal hygiene should not be roomed with residents at increased risk of infection.

In the case of known colonization or infection with VRE, special consideration for roommate selection should be given in the LTCF. Although a private room may be preferential for residents known to be colonized or infected with VRE, this may not be feasible. Co-horting with other residents known to be colonized or infected with VRE is another preferred option.

Semi-private rooms may be appropriate with opportunities for cross-contamination limited, provided risk factors of the roommate, containment of body fluids and personal hygiene of the colonized or infected resident are considered. A colonized or infected patient may share a room with a non-infected or colonized resident(s) who are **not** at increased risk for infection (e.g., residents **without** vascular lines, catheters, stomas, decubiti, or other wounds), **and** who do not have MRSA infection or colonization. A resident identified as colonized or infected with VRE who is incontinent of either urine or feces (regardless of the site of documented infection or colonization) or who is unreliable in personal hygiene should be placed in a private room or cohorted in a room with another VRE case. A VRE case should not be placed in the same room as a resident with current MRSA infection or colonization, in light of the potential for transfer of resistance.

If a resident with VRE is roomed with a resident who is not known to be colonized or infected, particular care should be taken to separate patient care supplies and employ appropriate handwashing between resident contact.

Termination of Special Infection Control Practices

A VRE case should be considered to carry the pathogen indefinitely. Current literature has not established data to determine the number of negative cultures or length of time following a negative culture which may predict eradication of VRE carriage. Individual patient factors such as source of known positive VRE sites, resolution of infection, whether or not colonization has been evaluated or identified, ability to control body fluids and personal hygiene must be considered if additional infection control practices are to be discontinued.

AVOIDANCE OF UNNECESSARY RESTRICTIONS

Activities within the LTCF

A resident colonized with VRE should not be excluded from therapeutic or group activities. A resident infected with VRE may participate in group activities so long as reasonable personal hygiene and containment of infected body fluids is maintained. Care should be taken to prevent stool, urine, and other body fluids from contacting environmental surfaces outside of the resident's room.

Admission and Transfer of VRE Cases

A VRE case may be admitted to or retained in a LTCF. The presence of VRE infection or colonization should not in itself preclude transfer of patients between health care facilities. Transferring facilities should notify receiving facilities as far in advance as possible of the known VRE status. Health care facilities transferring, discharging or receiving patients with VRE should share all clinical information relevant to the patient's VRE status.

CONTROL OF VRE OUTBREAK SITUATIONS

When three or more VRE cases (not including newly admitted residents who have VRE or residents being readmitted after a hospitalization who have VRE) are identified in a three month period, the LTCF should report this finding to the State Health Department. Consultation should occur whenever there is evidence of an increase in VRE rates or transmission between residents.

IDENTIFICATION OF VANCOMYCIN-RESISTANT STAPHYLOCOCCI

If the LTCF becomes clinically suspicious or receives laboratory notification of a case of vancomycin-resistant *Staphylococcus aureus* (VRSA) or vancomycin-resistant *Staphylococcus epidermidis* (VRSE), the LTCF should immediately contact the State Health Department for infection control guidance. The LTCF should have the laboratory contact the South Dakota State Health Department laboratory for guidance on where to submit the isolate for confirmatory testing and saving.

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